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Cyclin A1 regulates the interactions between mouse haematopoietic stem and progenitor cells and their niches

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Abstract

© 2015, Taylor & Francis Group, LLC. It remains poorly understood how the haematopoietic stem/progenitor cells (HSPC) are attracted to their niches and the functional consequences of such interaction. In the present study, we show that the cell cycle regulator cyclin A1 in association with vascular endothelial growth factor receptor 1 (VEGFR1), is required for HSPC and their niches to maintain their function and proper interaction. In the absence of cyclin A1, the HSPC in the BM are increased in their frequency and display an increased migratory and homing ability. Concomitantly, the ability of the endosteal and central BM niche zones to attract and home the wild-type HSPC is significantly reduced in cyclin A1-null mice as compared to the wild-type controls. The impaired proliferation and homing of HSPC in the BM of cyclin A1-null mice are attributed to the increased density of microvessels in the endosteal and central BM niche zones, which is associated with the increased VEGFR1 expression. Thus, modulation of cyclin A1 and VEGFR1 in HSPC and their niches may provide new insights into therapeutic approaches.

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Keywords

Bone marrow transplantation, Cyclin A1, Haematopoietic stem and progenitor cells, Homing and migration, VEGFR1